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Analysis of potential predatory journals in radiology

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PURPOSE
The aim of this study is to determine the presence and evaluate the features of potential predatory journals in the radiology field.

METHODS
The presence of the keywords related to radiology listed in the name of journals was investigated in Beall's list. We have searched and recorded the features and the information of the included journals listed under the following headings: address and location, publishing features, editorial board, indexing features, submission, and peer-review processes.

RESULTS
A total of 66 radiology journals from 27 publishers were identified from the updated version of the original Beall's list. Regarding the publishers, 33 journals (50%) reported an address in the United States of America, while others were from United Kingdom, India, Hong Kong, Iran, and Canada. While 44 journals' (67%) website reported a contact address, no addresses were declared in the website of 21 journals (32%). The median time of publication activity was 3.5 years (interquartile range [IQR], 1–5 years; range, 0–16 years). Thirty-five journals (53%) indicated their publication ethics policy on the website. Forty-seven (71%) journals reported a regular editorial board (EB) list. The competency of the EB was considered as "inappropriate" in 27 (41%) journals. Only 18% of the total number of EB members had affiliations related to radiology (n=286/1566). Forty journals (61%) did not report any indexing and database coverage. We found 26 journals (39%) which had a DOI number in its latest 5 articles. Fifty-nine (89%) journals clearly reported article processing change (APC) on the webpage. The median APC value was 641.43 USD (IQR, 300–918.75 USD; range, 100–2588 USD). Considering the latest 5 articles, the number of journals with radiologic images in all of the articles was 8 (12%). Mean peer-review time was 63.5 days (IQR, 21.75–87.5 days; range, 1–237 days) for the journals which indicated the submission and acceptance dates clearly.

CONCLUSION
We demonstrated the several main characteristics of potential predatory journals in the radiology field such as reliability of the reported address, APC, publication frequencies, indexing features, features of published article and peer-review time which were all found to be similar to the characteristics of potential predatory journals in other biomedical fields.

The term predatory journal was first coined by Jeffrey Beall, a librarian at the University of Colorado, to describe a fraudulent open-access model that applies charges to the authors under the pretense of legitimate publishing operations without providing adequate editorial services, including proper peer-review, as with legitimate journals (1). At present, more than 10000 predatory journals harboring more than 500000 articles are estimated to exist within the literature (2, 3). Those articles that do not undergo a peer-review process or are poorly reviewed have a negative impact on current and future scientific studies. This summative impact would cause irreversible consequences in the following years. To prevent the authors from becoming a prey to these predatory journals, Jeffrey Beall shared "Beall's list", a blacklist of potential or probable predatory journals, using more than 50 inclusion criteria in his blog in 2012 (4). The list was constantly updated and kept operational by Beall until 2017. Currently, Beall's list is active as an anonymously

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updated, freely accessible database on the web.

Predatory journals and their presence in the literature have been researched in recent years with increased awareness. Studies investigating predatory publishing in the fields of neuroscience, rehabilitation, nursery, dermatology, anesthesiology and critical care, otolaryngology, orthopedics, and pediatric urology are present in the medical literature.

This study aims to determine the presence and evaluate the features of predatory journals in the radiology field.

Methods

Three authors independently searched, analyzed, and archived a freely accessible, constantly updated online version of the original Beall's list (4). The last scan was completed on October 15th, 2019. Since the present study does not involve human subjects, there is no ethical committee approval and the informed consent was waived. It is confirmed that the study is appropriate for Declaration of Helsinki Standards.

The presence of at least one of the following keywords listed in the name of journals was investigated: "radiology", "imaging", "medical imaging", "radiography", "ultrasound", "computed tomography", "magnetic resonance", "interventional radiology". In case of any doubt or uncertainty about potentially relevant journals in each author's list, the decision was made by consensus considering the information reported in the aims and scope of the journal.

We have searched and recorded the features and the information listed under the following headings:

Address and location: The addresses of the publishers were noted and verified by using Google Maps application. The location was considered as reliable if any building is present at the given address, otherwise, it was accepted as unreliable.

Publishing features: The number of years of editorial activity, publishing frequency and presence of editorial policy/ethics about scientific misconducts were noted.

Editorial board: The presence of the editorial board (EB) list and the editor-in-chief (EIC) were evaluated. The number of EB members and their affiliation were noted in order to understand the EB competency. EB competency was defined as "inappropriate" when ≥30% of reported affiliations were mismatched with the journal scope; it was defined as "unidentified" if the affiliations were not clear and detailed enough to make a final decision. Otherwise, then EB competency was accepted as "appropriate".

Indexing features: The database/registries in which each journal claimed to be indexed were analyzed. We classified the indexing features in indices and databases like Google Scholar, MEDLINE, Scopus, Directory of Open Access Journals (DOAJ); and following or registered in organizations like International Committee of Medical Journal Editors (ICMJE) and Committee on Publication Ethics (COPE). Then we verified the journals' declaration about database coverage and indexing in these 6 indices, databases, and organizations' official lists. Additionally, the database or registries other than the aforementioned ones, the presence of the International Standard Serial Number (ISSN) of the journal and the presence of Digital Object Identifier (DOI) number of the latest 5 articles were also noted.

Submission and peer-review processes: Submission procedures were categorized into three patterns, i.e., by e-mail, directly on the website, or through a specifically designed submission manager program. The presence of an article processing charge (APC), the payment amount (in USD currency) and the availability of discount were noted. Non-USD amounts of APC were converted to USD according to current exchange rates. The total number of published articles and the review time which was accepted as the lapse between submission and acceptance of the latest five articles published in the current issue of the journal were recorded. If there were fewer than 5 articles published in the current issue, missing articles were completed and evaluated from the previous issue(s).

Statistical analysis

Statistical analysis was performed with SPSS 23.0 (IBM Corp.). Descriptive statistics were performed to calculate mean, median, totals, maximum-minimum values and interquartile range (IQR) for continuous variables. Categorical variables were reported as number and percentages.

Results

A total of 66 radiology journals from 27 publishers were identified from the updated version of the original Beall's list.

Regarding location, 33 journals (50%) reported an address in the United States of America, 12 journals (18%) in the United Kingdom, 7 journals (11%) in India, and one each in Hong Kong, Iran, and Canada. While 44 journals' (67%) website reported the contact address, no addresses were declared on the website of 21 journals (32%). In addition, two different contact addresses were identified in one journal (1%). The stated addresses of two journals were not verified on the map. Totally, the addresses of 23 journals (35%) were found to be unreliable. Fifty-nine journal websites (89%) indicated an e-mail address as the primary contact method.

The oldest journal on the list was first published in 2003. The median time of publication activity was 3.5 years (IQR, 1–5; range, 0–16 years). Detailed years of publishing activity and frequency of the journals are shown in Figs. 1 and 2, respectively. Thirty-five journals (53%) indicated their publication ethics policy on the website.

Forty-seven (71%) journals reported a regular EB list. Only 22 of these journals (33%) specified the name of EIC on their website. More than half of the journals (n=38, 58%) had no EB members whose declared affiliation was related to radiology. The EB competency of 19 journals (29%) without an EB list or whose editors' affiliations were not clearly understood was accepted as unidentified. The competency of the EB was found to be inappropriate in 27 journals (41%) and appropriate in only 20 journals (30%) (Table 1). Only 18% of the total number of EB members had affiliations related to radiology (n=286/1566).

Twenty-seven journals (41%) reported an ISSN number. Forty journals (61%) did not report any indexing and database coverage. Indexing and following features of the journals in 6 major indices, databases and organizations (Google Scholar, COPE, MED-

Main points

- There is a considerable amount of potential or probable predatory journals related to radiology and their number is increasing day by day.
- Presence of article processing charge (APC), inappropriate peer-review process, indexing in probable fake-metrics rather than major databases, and having an inappropriate editorial board are the most common features for illegitimate and predatory publishing.
- The authors should be aware of these journals in order not to waste their scientific work resulting from long and valuable efforts.

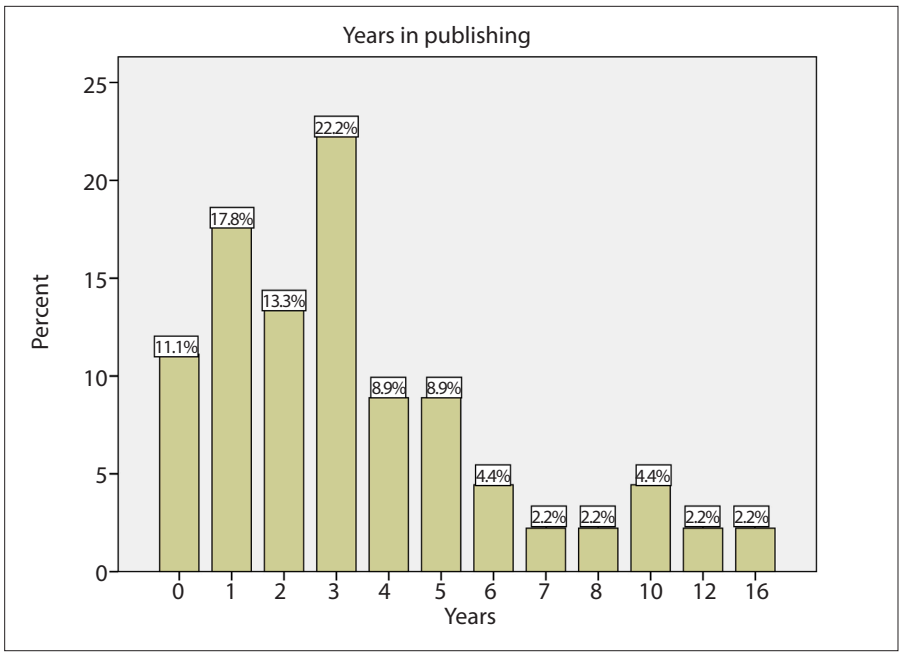

Figure 1. Detailed years of publishing activity of the potential predatory radiology journals.

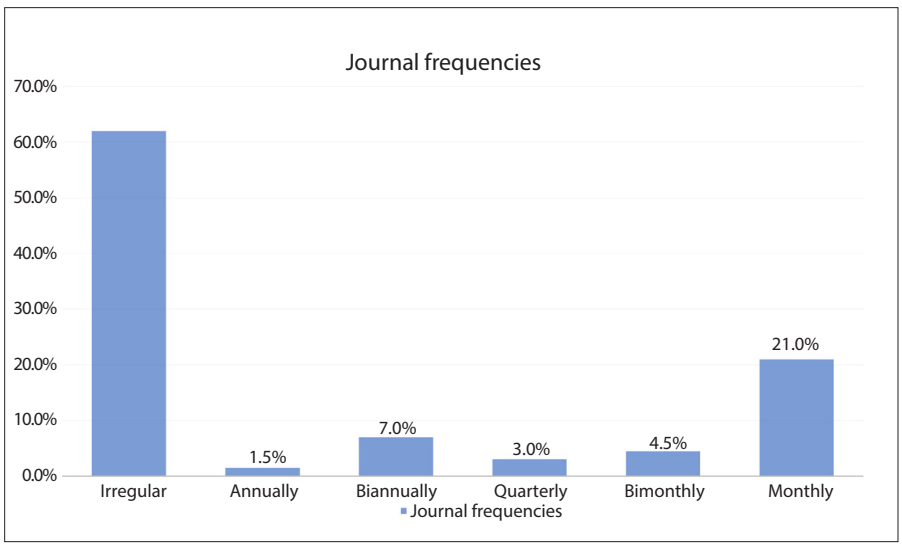

Figure 1. Detailed years of publishing activity of the potential predatory radiology journals.

Table 1. Editorial board competency of the potential predatory journals

Editorial board competency	No. of journals, n (%)
Appropriate	20 (30)
Inappropriate	27 (41)
Unidentified	19 (29)

LINE, Scopus, DOAJ, ICMJE), including the numbers of the journals claiming verified registration or coverage is shown in Table 2. Furthermore, all of the journals indexed in major databases also declared to be indexed in at least one other database that could be accepted as potential fake-metrics.

The average number of indices that the journals claimed to be registered in, except for these major indices, databases and organizations was 3.83 (IQR, 0–4.25; range, 0–41) per journal. Twenty-seven journals (41%) had no published articles. We found 26 journals (39%) which had a DOI number in its latest 5 articles. But articles in 13 journals (20%) were published without a DOI number.

Submission procedures of the journals are shown in Table 3. Fifty-nine (89%) journals reported APC on the webpage. The median APC value was 641.43 USD (IQR, 300–918.75 USD; range, 100–2588 USD) independently from the submission categories. Eighteen (30%) of these journals stated that they offer waivers under certain conditions. The total number of articles published in all the potentially predatory journals was 4834 (Fig. 3). The average number of articles per journal was 73.4 (IQR, 0–34.5; range, 0–1084). There were no original articles among the latest 5 articles published in about half of the journals (n=32). There were only 10 journals (15%) in which the latest 5 articles were all original articles. Considering the latest 5 articles; while the number of journals with radiological images in all of the articles was 8 (12%), the number of journals without radiological images in any of the publications was 31 (47%) (Table 4). We found 30 journals (45%) which indicated the submission and acceptance dates clearly for the latest five articles. Mean peer-review time was 63.5 days (IQR, 21.75–87.5 days; range, 1–237 days) for these journals.

Discussion

As expected, the main findings of our study showed that the indispensable rules of the scientific article publishing processes were not adopted by the potential predatory journals in the field of radiology. The existence of even a simple feature of known and accepted radiology journals in the vast majority of these publishers exposes the point reached in predatory and illegitimate publishing very clearly.

The initial literature in predatory publishing has been focused on the general comments and the potential risks of medical scientific developments (5, 6). But detailed evaluations of potential predatory journals and articles in the specific medical fields are now taking place in the current literature (7, 8). To the best of our knowledge, this is the first study about predatory publishing in radiology.

There are some common features discussed in the literature for predatory journals (9). First of all, one of the most concrete indicators of the reliability of a journal is the presence of a verified address and contact information. Almost one-third of the journals were found to be unreliable in our study. Cortegiani et al. (10) reported this ratio as 43% in their study focused on predatory publishing in critical care medicine.

Table 2. Indexing features of the journals in six major indices/databases/organizations.

Indices/Databases/Organizations	Claimed	Verified	Unverified
MEDLINE	2	2	0
SCOPUS	1	1	0
DOAJ	1	0	1
ICMJE	6	1	5
COPE	1	1	0
GOOGLE SCHOLAR	20	17	3
Total	31	22	9

COPE, Committee on Publication Ethics; DOAJ, Directory of Open Access Journals; ICMJE, International Committee of Medical Journal Editors.

Table 3. Categorization of the submission features of the journals

Submission method	Available, n (%)	Not available, n (%)
Dedicated submission program	22 (33)	44 (67)
By e-mail	42 (64)	24 (36)
Directly on the website	21 (32)	45 (68)

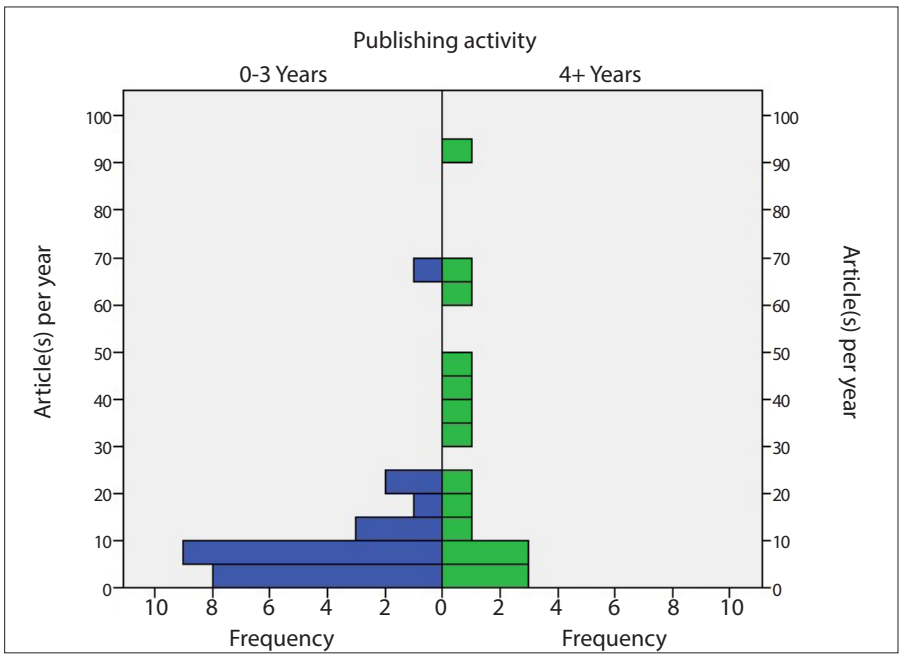

Figure 3. Distribution of journals by mean number of articles per year.

Since the publication policies are not based on certain rules, other expected features for illegitimate publishing is the irregular frequency of publication. We demonstrated that about two-thirds of the journals in our study have irregular publication frequency. On the other hand, considering the median time of publication activity (3.5 years), it is clear that the number of such potential predatory journals have been increasing significantly in the last 5 years.

The most accurate and prevailing method for the evaluation of a scientific paper is the appropriate peer-review process by the editors and reviewers who are experts in the issues related to the content of the manuscript (11). Although we could not obtain data on the potential reviewers of the journals, it should not be forgotten that the EIC and the EB members are responsible to oversee the peer-review processes. This point is called "editorial board competency". In addition to this, the EIC who leads the publication activities of the journal must be identified. The adequacy of these two points without any suspicion means that there will be a proper and scientific article evaluation process. We found the EB competency as appropriate in only one-third of the journals in the present study. Worse, only 18% of all EB members' reported affiliations were related to radiology. In contrast, the EB competency was found to be sufficient in nearly half of the journals in the study of Cortegiani et al. (10).

Table 4. Journals containing radiological images in the last five articles published

Article(s) with radiological image(s)	No. of journals, n (%)
0	31 (47)
1	4 (6)
2	9 (14)
3	10 (15)
4	4 (6)
5	8 (12)

Apart from the quality of the journals and the publishers, one of the main parameters for a journal to demonstrate the scientific validity and impact of its articles is being indexed in well-established electronic databases. However, database coverage is not always the guarantee of the journal integrity (12). It is necessary to highlight two points related to database coverage and indexing features. One of them is the presence of well-established electronic indices, databases and organizations that the journals claim to be indexed in and the other one is the verification of the journals' declaration about this database coverage and indexing against the possibility of it being fake-metrics. In our study, we demonstrated that 40% of the journals that claimed to be indexed in major databases were in fact not indexed. In other words, it is not surprising to encounter fake-metrics and databases in predatory publishing (13). DOI number is a digital article tag, and it is accepted as the standard for unique and permanent online content identification and linking on the Internet. While the usage of DOI number is about 90% in the Web of Science Core Collection (14), we found only 38% of the journals using the DOI number in our study.

Another concept that was introduced with illegitimate publishing is the article processing charge, more widely known as

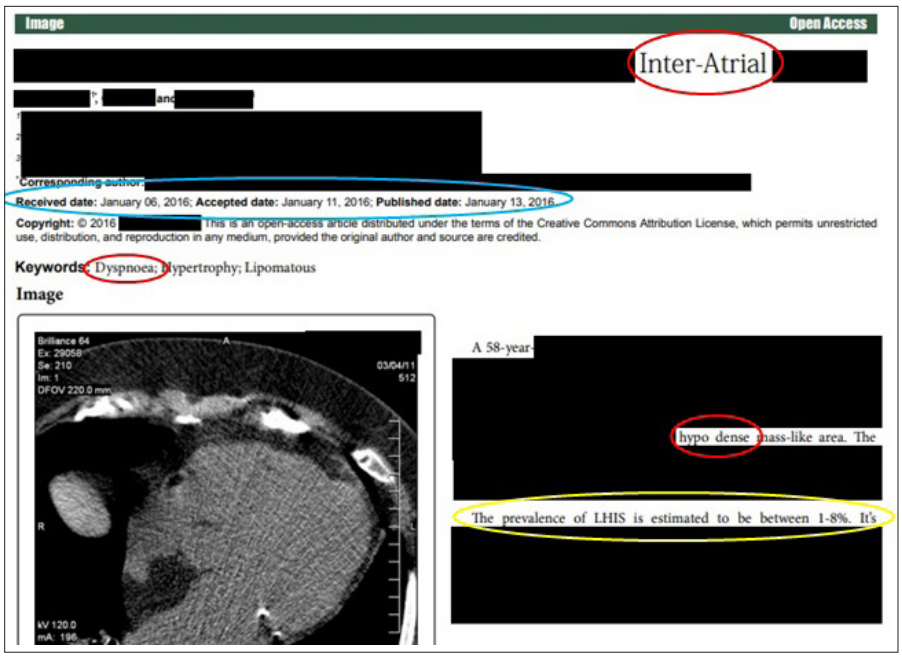

Figure 4. Example of an article published in one of the potential predatory journals analyzed in the study. There are some misspellings in the title, keywords, and within the main body of the article *(red oval callouts)*. No reference for the basic literature data *(yellow oval callout)*. Please note the rapid review and publication period *(blue oval callout)*.

APC. Although it is also available for some reputable medical scientific journals, this term is quite common in predatory publishing. The requested fees also enhance the interest in legitimate publishing, besides being the potential fund for these journals. However, we do not suggest that every article could be published directly without any peer-review process if the APC is paid, since the article acceptance rates of the journals could not be established. In this present study, we found that almost all of the listed journals reported APC clearly on their webpages and the median APC value was 641.43 USD. The average APC amount (634.5 USD) in the study of Cortegiani et al. (10) about critical care medicine is very similar to our value. However, it is a somewhat lower than the average APC value (751 USD) declared in the study of Manca et al. (15) about predatory rehabilitation journals.

The articles related to radiology are expected to involve certain radiological images except for a few specific types such as editorial, letter to the editor, or commentary. The presence of the didactic images demonstrates the quality of the article as well as its scientific content. We found this feature in only about one-tenth of the journals in our study and this rate was quite unsatisfying for publishing policy in the radiology field. On the other hand, the number or ratio of the original articles published in the journal is an indirect indicator of the journal's quality. In the present study, almost half of the journals were outside of this scope.

Acceptance without a proper and serious peer-review process or after a very short and inappropriate evaluation period is quite common in predatory publishing (16). Hence, a considerable amount of these published articles contain some obvious structural and methodological errors (Fig. 4). This is the main point that misleads the science. We found that in more than half of the journals (55%, n=36), the submission and acceptance dates, evidence of peer-review process, were not stated clearly. Yan et al. (9) reported that the response period was less than one month in %36.5 of all the predatory journals. Nevertheless, the mean peer-review time for the journals (45%, n=30) was 63.5 days in our study.

Interestingly, potential predatory journals also have proactive aspects. Although not examined in the present study, sending invitation e-mails to the members of the related field about submitting an article or becoming an editorial board member of their journals is quite common feature for these journals (17). In other words, they make a living the hard way.

Apart from its contribution to science, which should be the main goal, the most important aim in publishing an article is to use it for academic promotion. From this point of view, taking active measures by formal government structures would be the most effective method in order to limit popularity and spread of the potential predatory journals. In a study on awareness about predatory journals by Christopher et al. (18), it was reported that only 23% of the authors had considered the journal where they submitted their article as predatory and the awareness rate about Beall's list was found to be only 4.8% among the authors. Therefore, raising awareness of illegitimate publishing and potential predatory journals among the authors and the academicians through conferences, editorials, and other activities is another important and proactive measure. Abstaining to submit the articles to these journals and not replying to the invitation emails sent by potential predatory journals are some examples of the author's responsibilities.

Since the criteria which define the journals as potential predators have not yet reached a consensus, the main limitation of our study is using the Beall's list. Another limitation of our study is the evaluation of only the journals which have radiology-related names. We did not investigate the medical journals whose scopes covered but were not limited by the radiology field.

In conclusion, we demonstrated the main characteristics of potential predatory journals in the radiology field such as reliability of the reported address, APC, publication frequencies, indexing features, features of published articles and peer-review time, which were all similar with their counterparts in other biomedical fields. As in the other fields of medicine, there is a considerable amount of potential or probable predatory journals related to radiology and their number is increasing day by day. The authors should be aware of these journals in order not to waste their scientific articles prepared with long and valuable efforts. On the other hand, taking active measures to avoid selecting these predatory journals is the main point to limit their spread and prevent misleading science.

Conflict of interest disclosure

The authors declared no conflicts of interest.

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